SEPTEMBER 6, 1961

GAS IN INDUSTRY

Supplement to the "GAS JOURNAL"

Vol. 4 No. 40

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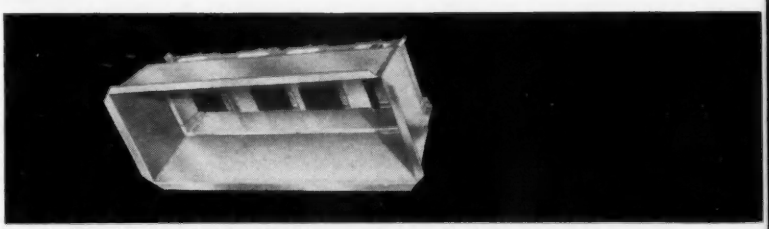

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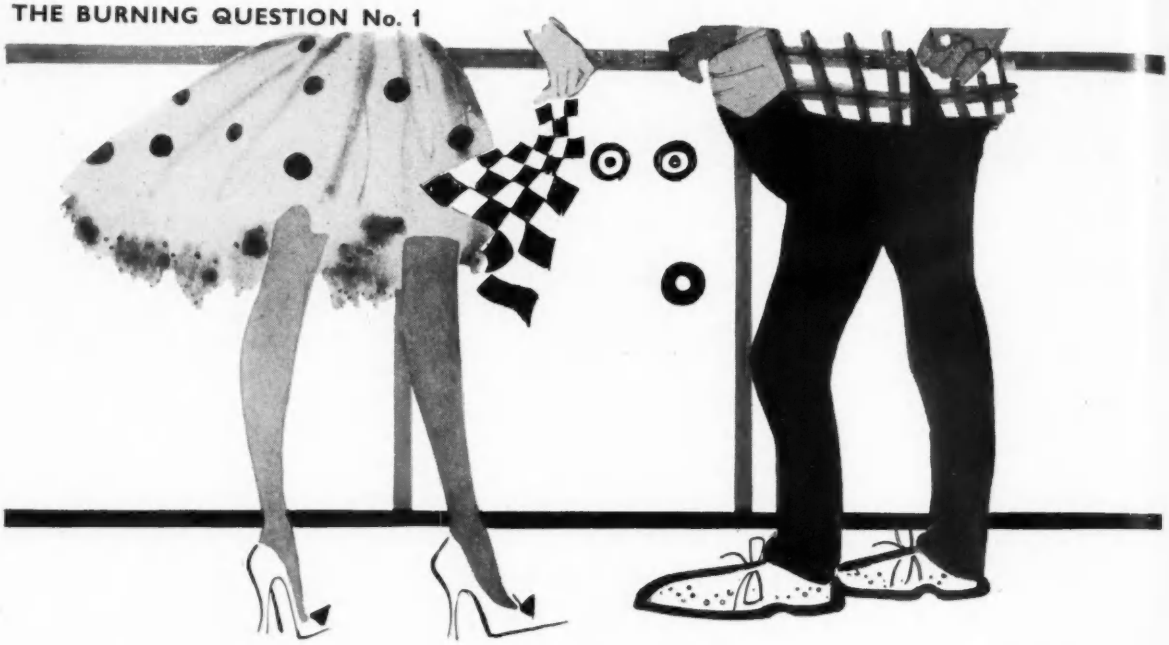

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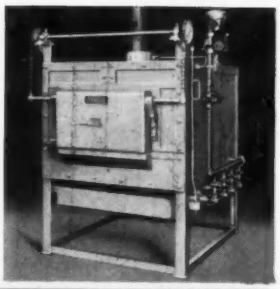

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GAS IN INDUSTRY

SEPTEMBER 1961

Vol. 4 No. 40

FEATURES

DEVELOPMENT OF 'PACKAGED' GAS BURNERS
By G. W. Robertshaw

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Editorial

Industrial 'packaged' burners

THE origin of the 'packaged' plant unit is quite certainly American, but the British engineer is by now accustomed to such things as 'packaged' boilers, which are self-contained steam raising units, generally fired by oil. The particular usefulness of the 'packaged' unit is that it is complete in itself, and can be purchased, as such, just as a 'kit' may be bought by the 'Do-it-yourself' enthusiast to assemble a very large number of objects from catamarans to sports car bodies.

The chief advantage in the 'packaged' transaction, whether it be a deal or a piece of plant, is that in all probability the purchaser knows exactly what he is getting. When it is a plant that he is buying he can have every confidence in the standard components, which will have been well tested and found to be satisfactory.

This idea of a collection of units does not seem to have been quite so popular in England as it has been on the other side of the Atlantic

However, the benefit that can be gained from the 'packaged' idea has caught on to an increasing extent in this country in recent years, and we have noticed it, for instance, in the production of gas-fired boilers for small-bore central heating installations. Included with these boiler units are heat control thermostats as well as the circulating pump.

To develop this idea still further would be to design and manufacture gas-fired burner units complete with all ancillaries—fans, heat control, pilot safety devices and such like—which normally go to make up the equipment for an industrial installation.

A paper by Mr. G. W. Robertshaw, of the Industrial Department of the Manchester Undertaking of the North Western Gas Board, which is published in 'Gas in Industry' this month, shows how a 'packaged' burner unit has in fact been designed in this department, and later adapted for facilitating the conversion of industrial plant for gas-firing.

It appears that the original conversion calling for the unit, was that of a large oil-fired continuous bakery oven which was to be moved from one part of the bakery to another and to be converted to gas-firing.

The simple answer to the problem would have been to replace the American oil-fired burner by a similar gas-fired burner of equal quality, also made in America, but the bakery firm did not want this and specified a conversion unit manufactured from British-made components.

Since such a unit was not in existence Mr. Robertshaw and his colleagues had to design one, and assemble suitable components into a 'packaged' unit. The result was successful, and proved itself in helping to convert other appliances to gas, such as large-scale central heating boilers.

The magnitude of Mr. Robertshaw's achievement is clearly demonstrated when it is realised that heat inputs of 700,000 to 2.1 mill. B.t.u. per hour were successfully met by these units which were small enough to take the place of the solid fuel furnaces without undue modifications to the boiler structure.

Abstract from a paper read to the Manchester District Junior Association of Gas Engineers.

DEVELOPMENT OF 'PACKAGED' GAS BURNER EQUIPMENT

by
G. W. Robertshaw, A.M.I.Gas E.

Industrial Development Engineer, Manchester Industrial Development Centre, North Western Gas Board.

THIS paper is devoted to the development over two years of 'packaged' burner equipment of a type suited for the conversion of solid fuel boilers to gas firing and many other industrial applications.

For the purpose of this paper a 'package' burner is defined loosely as a burner which is fitted with associated control and air supply equipment in unit form in a manner which enables it to be installed with the minimum of site work.

This is in contrast to the normal procedure associated with manufactured gas of selecting each individual item of equipment appropriate to a particular requirement.

General design and development of Mark 1 'packaged' burner.—A 'package' burner was first called for in the North Western area in January, 1958, when it was decided to move a 160-ft. long oil-fired continuous baking oven from one site to another and convert it to gas firing.

The existing burners were standard oil burner units of U.S. manufacture and a similar type of burner designed for gas, again of U.S. make, was proposed by the manufacturers.

But our clients were keen to use British-made equipment and so we were asked whether similar units were available.

Fig. 2.—Mk. I unit during construction.

PRESSURE-AIR TYPE

Although there were any number of burners available of the required capacity for the particular conditions pressure-air burners were needed, and there were none of British manufacture which could be compared with the U.S. specification which, for a burner input of 700,000 B.t.u. per hour, included the following combustion and control equipment:

1. Pre-aerated main burner with multislot burner ports and surrounding secondary air duct.
2. Combustion air fan.
3. Relay type valve for on/off temperature and flame protection control.
4. Pilot supply governor, manual cock and pilot burner.
5. Electronic flame protection unit and sensing probe.
6. Solenoid valve in relay weep to operate in conjunction with items 3 and 5.
7. Low voltage igniter transformer and igniter assembly.
8. Centrifugally operated pilot valve for permitting ignition on fan operation and close-down on fan stoppage.

DIMENSIONS

The physical dimensions of the unit were approximately 15 in. cube; the burner tube extension was some 6 in. diameter and 10 in. long with flange to seat into the combustion chamber entry.

Such a burner designed for town gas was likely to have a home market but the demand for it was an unknown quantity, so the design should be as simple in principle as possible, and in practice be easily fabricated to establish principles of operation, to facilitate modifications and, most important, to make small batch production a commercial proposition.

Some form of co-axial nozzle mix-

ing burner was the obvious choice, and the first decision to be made was whether to adopt central gas or central air discharge.

The former was chosen for the initial trials, because (a) it followed the pattern of accepted low pressure fan air burner design, (b) the pilot in the centre of the burner appeared to guarantee safe ignition, and (c) a 'clean' exterior seemed easier to design with the gas and ignition parts fitted internally.

INITIAL TRIAL

A cast air directing multiple nozzle as illustrated in Fig. I(c) was used for the initial trial. This worked satisfactorily provided that the diameter of the individual air jets did not exceed the distance between the jets. As the air jet diameter was increased, an excessive velocity of the combined air streams from all the jets made the flame unstable. This tendency could have been reduced by increasing the pitch circle diameter of the air jets or retaining small air jets and increasing the air pressure. Since neither of these seemed desirable, the method was discarded.

Sheet metal deflectors were then tried in the air stream, designed to facilitate the alteration of the direction of the air flow by bending the metal; this was less arduous than preparing many alternative cast sections. If successful it meant getting away from the traditional 'cast' approach, with some possible advantages.

FINAL DESIGN

The final design shown in Fig. I(d) consisted of a single sheet of metal cut and bent to form two main air streams directed toward each other. The result is a rather flat flame stabilised in the zones of low velocity of 90° to the main air streams. By varying the air discharge angle it was found possible to obtain either a long or short flame. The design was therefore considered suitable for the particular use required and being so readily modified would be capable of being adapted to other uses.

By chance a suitable fan was already available at the Manchester Industrial Development centre for early tests. Two of its main virtues were extremely silent operation, and lightness combined with rigidity secured by the use of a cast aluminium housing.

The shape of this housing was that of a pressure rather than a volume fan; it was narrow in relation to the outside diameter and the outlet con-

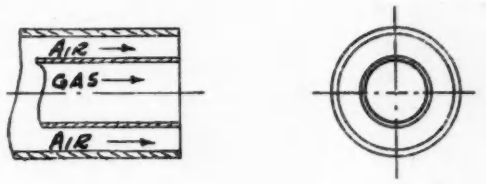


Fig. 1A.

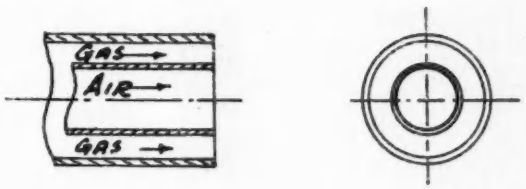


Fig. 1B.

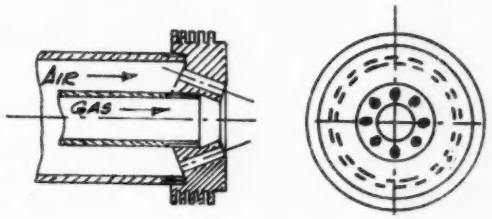


Fig. 1C.

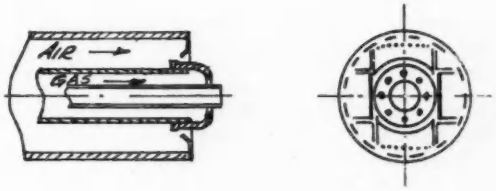


Fig. 1D.

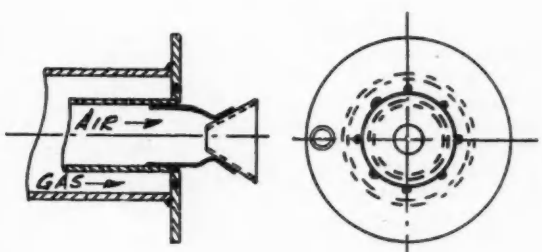


Fig. 1E.

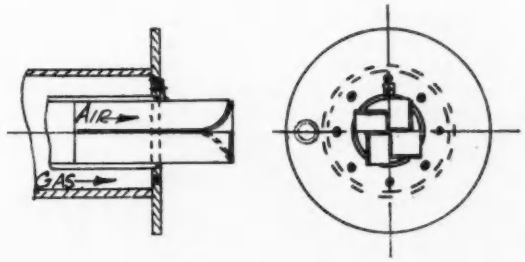


Fig. 1F.

An Ideal 410K Boiler conversion.

nection was of relatively small cross sectional area. This design would give more scope for alternative burner design and confer an advantage in respect of utilisation efficiency. A feature of a forced draught burner is that on shut-down by temperature or time control there is a smaller area at the burner allowing ingress of unwanted air. Complete air shut-off can be obtained by mechanical means and has been applied to a make of oil burner, but was considered at this stage to introduce an unnecessary complication. The smaller than normal air flow area in this fan would assist further to reduce this flow. In addition, the volume flow through the higher velocity fan would be less liable to fluctuation caused by marginal changes in pressure conditions within the combustion chamber.

The higher calorific value of natural gas, coupled with a higher distribution pressure, enables controls to be much smaller for a given throughput than is possible for manufactured gas. To avoid components which would be built into the unit becoming unwieldy, it was decided to utilise what little pressure energy was available in the gas flow to overcome pressure losses through the controls, and use the fan air energy only to achieve rapid gas and air mixing. A useful side effect was also the saving in cost of components. A reduction in control and connection size by one pipe size made possible by using fan air can make a useful contribution to the cost of the fan.

The burner was therefore designed to require less than 1 in. w.g. at the burner ports, leaving 1.5 in. w.g. for loss through the controls and connections. Thus, for a maximum gas rate of 1,500 cu.ft. per hour, the main control size was 1½-in. B.S.P. in place of 2-in. B.S.P.

The pilot supply presented no difficulties.

SAFEST CONTROL

The smallest electronic flame protection unit available at that time could be compared in size with a portable radio of the pre-transistor era. It was reluctantly decided to include it in an adjacent electrical cubicle. The fluctuating infra-red principle was chosen as being the safest method of control then available.

The main relay weep solenoid is built into the type of main relay chosen.

High voltage spark ignition was chosen as being the most reliable under what might possibly be arduous service conditions, and the spark ignition pilot burner developed for this package burner was of novel design and has subsequently found many applications.

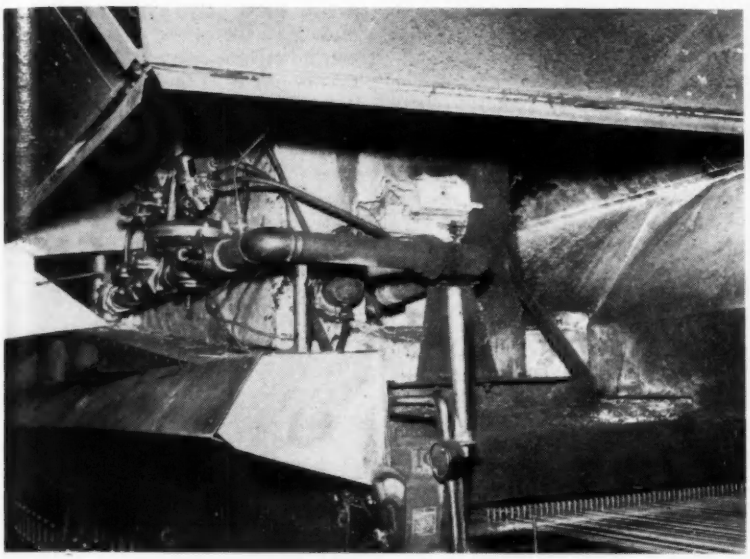
It consisted of a centre electrode surrounded by the pilot gas stream and terminating in an annular orifice some .01-.02 in. in width. The gas blows the spark to the outer rim of the orifice where combustion takes place in the surrounding air.

The dimensions of the commercially available type of fan failure switch normally used in conjunction with gas equipment was some 9 in. high by 4 in. wide by 3 in. deep, and so was unwieldy. A device was therefore developed which has been subsequently named the Microvane air-flow switch, and is based on its components. They comprise a microswitch with a vane fitted to the actuating level enclosed in a casing of dimensions 2½ in. by 2 in. by ¾ in.

This unit is fitted to the side of the fan casing so that the flow of air towards the fan delivery blows the vane and trips the contacts, which are in series with the main relay actuating solenoid. In this way the fan must run up to speed before the main gas relay opens, and should the fan fail, the gas flow is stopped.

In the U.S. counterpart, which couples the functions of fan protection with supplying gas to the pilot burner, a centrifugally-operated dual valve is attached to one end of the fan motor. One valve is in the supply line to the pilot burners and the other in a weep or bleed to a gas-operated relay control in the main supply. Thus until the motor runs up to speed no gas is available at the pilot for ignition

Model 12-26 unit.



Burner equipment fitted to indirect air heater.

and subsequent detection by the flame protection device, nor is it possible for the main gas to flow. Should the fan fail both valves close, and both pilot gas and mains gas are shut off.

Eight Mark I burners were constructed, and general operation and flame characteristics were in line with the requirements. Fig. 2 shows the general appearance before completion. There were troubles, however, because of the extremely dusty atmosphere in which the burners were operating which led to fouling of the microvane air-flow switch, and in the frequent shut downs caused by the pilot burner being extinguished. Both conditions, peculiar to the installation, were eventually cured.

UNIT TEST

The conversion of a central heating boiler close at hand to the Centre provided the opportunity to test the unit for this purpose.

This boiler, the Ideal Britannia 36K, has water-cooled fire bars, and insulation was applied beneath these to retain the maximum heating surface. No other internal brick work or baffling was used. On test the following results were obtained.

The boiler, with a rated output of 379,000 B.t.u. per hour, and a rated input of 5.05 therms per hour based on 75% efficiency, showed an actual heat input of 5.95 therms per hour and an actual heat output of 121% of nominal rating.

In the revised design and the development of the Mark II burner, the first experiment was to construct an annular gas duct around the central air stream with gas orifices drilled to fire in the same direction as the air stream. The flame behaved as expected, with a relatively slow combustion rate and an excess of gas round the periphery of the centre core of air.

COMBUSTION RATE

In order to shorten the flame and increase the combustion rate the air was directed outwards into the gas stream. Two methods were applied, initially a frustrum of a cone was supported in front of the burner face so that the majority of the air flow was directed outwards while the remainder was discharged through the centre orifice, This gave the desired effect and was fitted to the first field installation. A disadvantage was that to alter the flame shape it was necessary to replace the cone with one of different shape.

An alternative type was made from strip steel in the form of a cross, Fig. 1 (f), the ends of which were bent in the same direction when end-viewing the device. When tested the flame shape was not as uniform as previously but by varying the degree of bending of the leading edge the flame could be varied at will.

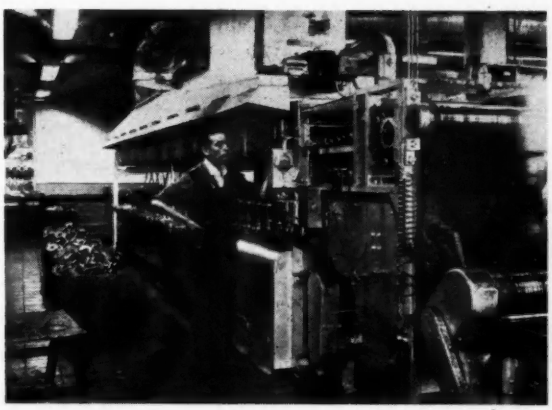
MORE SUITABLE FAN

The fan was found more suitable for the revised design than the earlier one, since the fan outlet could now be connected directly to the air discharge nozzle. This also gave an increased discharge rate for a given fan since there were no longer any drastic changes in direction and velocity of flow.

In an attempt to use the smallest physical size controls further work was carried out on pressure losses, and tests on alternative manufacturers' relay valves showed that in the 2-in. size, the rating is nearly 75% greater for one type than for another for a given pressure loss; the choice then lay between the two with the lowest loss, and the lowest cost valve was therefore chosen. Though it suffered from an excessive shut down time when used in conjunction with flame protection equipment, it was modified by increasing the weep rate to 7 cu.ft. per hour which reduced the closing time to three seconds or less.

The quest for a smaller and cheaper flame protection unit led to trials of a relay manufactured by Danfoss Ltd. operating on the principle of using a flame for the rectification of an a.c. current. The size and cost of the basic unit was approximately a fifth of the previous type. Its performance was found to be quite reliable, but was entirely dependent upon the type of pilot burner used in conjunction with flame probe.

For general use it is desirable to have a minimum pilot gas rate, especially so for use on boilers where it is vital to have a low rate or no pilot at



No. 6-12 unit fitted to indirect air heater.

all when heat is not required. The co-axial igniter was, therefore, dropped, since the very small spark gap for a low gas rate was considered to be too critical to be reliable.

Finding the best flame conditions for holding in the amplifier relay proved difficult, and the earliest type was too adjustable, since in the hands of the inexperienced—and sometimes of the experienced—it was a question of luck rather than good judgment. The second type now in use on all units, has only one adjustment, and once set, rarely fails.

PILOT GAS RATE

The present pilot gas rate is 3 cu.ft. per hour only. This has particularly impressed users accustomed to earlier conversions, some of which required many times this consumption.

The microvane control was retained, but its position moved and the vane size increased to give a higher operating force. The casing in which it was housed was increased in size to 3 in. by 3 in. by 2 in. to accommodate additional electrical connections and increase its strength.

There are a number of boilers in schools and other properties owned by the Manchester Corporation which have been converted to gas over the past years. Various methods of conversion have been used, but the majority were Hypact burners firing on to a broken refractory bed. The Manchester Corporation heating department have always been keen to obtain the maximum fuel efficiency, and many of these installations are equipped with comprehensive temperature controls. Furthermore, the National Industrial Fuel Efficiency Service are under contract to carry out periodic efficiency tests for all fuels used.

This report was considered to be very encouraging and a series of detail alterations were carried out incorporating the improvements suggested. In June 1960 a final test was made by N.I.F.E.S.

Subsequent to the installation of the eight Mark I units to the baking oven, it was discovered that the on-off heat control was not satisfactory, although it was in line with the manufacturer's specification. The fluctuation in temperatures inside the plant was found to be sufficient to give uneven colouring of the product. The high-low flame control necessitated adding a main flow solenoid valve, and this opportunity was taken to rebuild the burner to the Mark II. design. They have since given every satisfaction. In order to obtain as great a degree of standardisation as possible, the first boiler unit was also rebuilt, and its performance was found to be identical to that of the MK.I. unit.

Three separate Mark II installations were now successfully completed and sufficient experience of the behaviour of the components obtained. Many details have now been tidied up. Since a number of each size of unit are now in operation, more accurate rating information is available.

The appearance of the burner has been much improved by the inclusion of as many electrical components as possible in a single housing. Microswitches have been substituted for the larger conventional switches, and together with the indicator light are included within the removable cover.

The three leg stand is now standard and allows rotational and vertical adjustment.

Among completed installations, the Manchester Corporation Education Committee have converted several central heating units. These include two No. 12-26 units superseding natural draught conversion on Beeston Colonel 6 KLN Boilers which are very short in relation to the overall size. It is therefore difficult to obtain the high thermal efficiencies as previously reported. On a comparison test, however, the flue temperature on the new conversion was 540°F. compared with 700°F. on the other, all other conditions being equal. The overall flue loss as finalised is 25%.

TWO MORE UNITS

Another two No. 12-26 units have superseded natural draught on Ideal 410 K. boilers, one of which was used for the original test work and the efficiency results are as previously noted.

A third No. 12-26 Unit has been fitted to a new Hartley & Sugden coke fired boiler rated at 616,000 B.t.u. per hour. The unit was adjusted to 100% boiler rating; the flue temperature was 470°F. and CO_2 content 10%. The flue loss is 21%.

In the North Eastern Gas Board's area a private company in York has fitted six No. 45-70 Units to four Ideal 6.R.13 boilers rated at 2.112 mill. B.t.u. per hour and two Ideal 513K. boilers rated at 2.152 mill. B.t.u. per hour. It is the largest conversion from coke to gas firing carried out recently and the N.W.G. units have been very well received.

Industrial applications include an indirect air heater and foundry ladle heating. An example of the former was the supplying and installing of the burner equipment to an American design of continuous nylon setting plant.

This was a repeat order of a plant heated by a Hypact burner firing into a combustion chamber from which horizontal heat exchanger tubes emerge. The burner was fitted with flame protection and temperature control equipment.

The second plant of the same description and recently built was to be similarly fitted, when it was realised that a 'package' unit might be used. After a demonstration at the Centre for the benefit of the Works Engineer, the proposals were accepted and a No. 6-12 unit was installed.

SAVING IN COST

An idea of the saving in cost by fitting the 'package' unit may be estimated when it is realised that the selling price was only £127, whereas the total selling price of the components in which electrical flame failure was included, using the previous system, would have been approximately £100. Realising that all wiring and internal connections of the 'package' unit are complete it is easy to see that the total cost of the latter including installation, electrical wiring and supervision would have exceeded that for the 'package' unit.

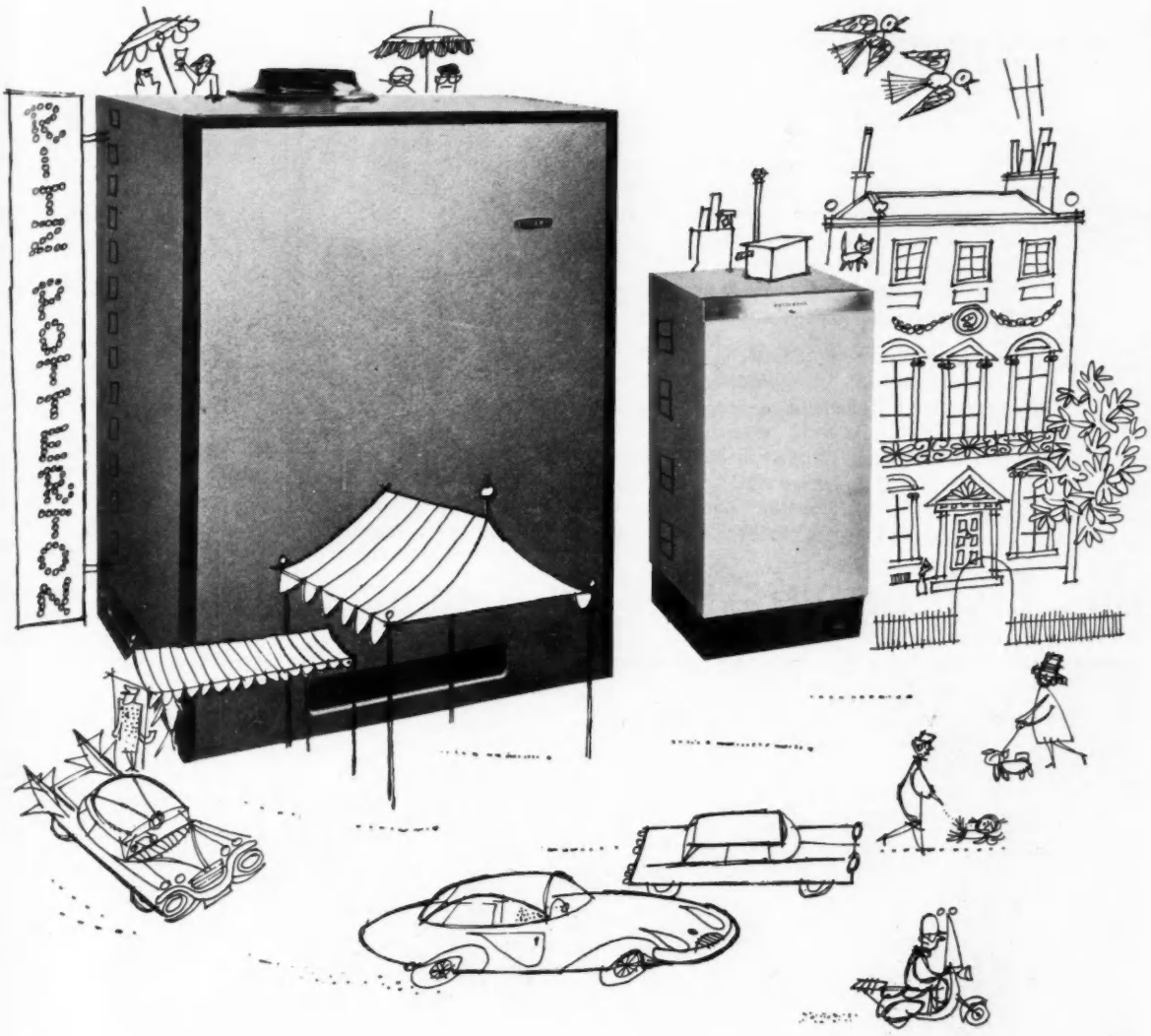
The present stage in the development of the 'package' burner may be described as intermediate. As now presented the unit fulfills the majority of technical requirements and is of presentable appearance. It is suitable for batch production and should be sold commercially at prices not far from those quoted in the reports issued.

There is, however, no doubt that improvements can be made and as the demand grows a re-design as now outlined will be well worthwhile.

The unit has the 'built-up' appearance and could be streamlined considerably. For quantity production the fan housing and burner could be a piece casting which would include suitable mountings for the pilot burner, transformer, fan failure switch, floor support leg, flame protection housing and main gas controls. Even the half way stage of keeping the burner and fan separate, but redesigning each to include the items mentioned, would be worthwhile.

Technically any improvement would be aimed at making the burner applicable to a greater number of appliances by making it possible to achieve high-low flame control with controlled air flow for both conditions. At the moment high/low flame can be accommodated, but the air rate would remain unaltered.

A detailed modification which is already on test is to dispense with the pilot gas rate when controlled by thermostat or time.



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the fallacy

that you need *complicated* installations and expensive equipment to get the increased safety and efficiency of automatic control.

the picture

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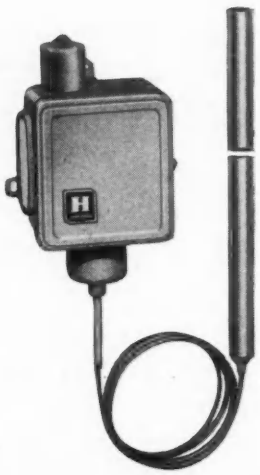
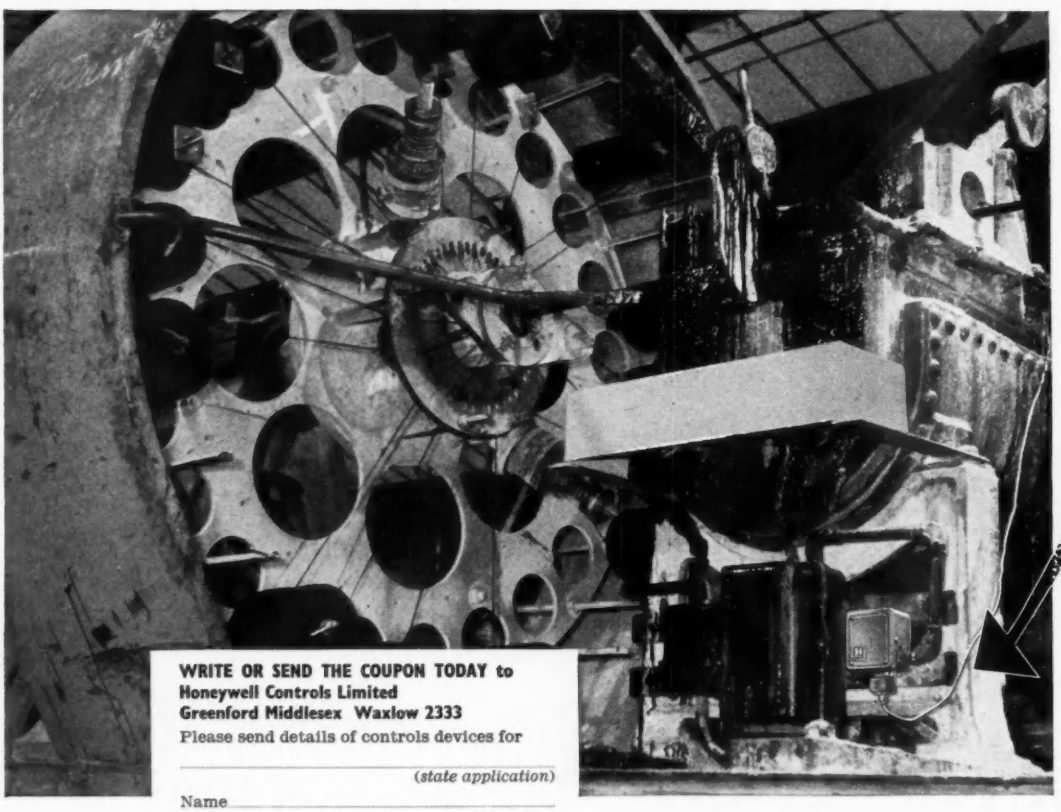
And temperature's not the whole story. There are similar Honeywell control devices for pressure, flow, differential pressure, humidity, liquid level. All are *inexpensive*, extremely *versatile*, and virtually *maintenance-free*. If you have still to investigate the possibilities of Honeywell control devices it would pay you to do so now.



this Picture puts paid to a popular fallacy



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SIGNS OF THE TIMES

DOWN the years, there have been many ways of making signs—from chiselling stone and carving on wood, down to work in cast and wrought irons and ordinary paintwork.

But today the great majority of the finely-coloured signs seen all around are finished in porcelain enamel on metal, or in lighter enamels on glass, says 'SEGAS', the house journal of the South Eastern Gas Board.

Where bus-stop signs, railway signs and street names, of a permanent nature, have to bear the brunt of our unkind weather, it is desirable to give them a structure and finish which will stand up almost to anything—even the hot sunshine sometimes experienced.

Ideal finishes

Porcelain enamel finishes are ideal for these purposes, as rain, snow, frost and fogs are quite harmless against them—and the sun will not damage either the surface or its colour, and such signs will stand a fair amount of unnatural knocking-about, too, says 'SEGAS'.

The article continues:

To study the application of gas in this industry we were invited to visit the Sydenham works of Burnham & Co. (Onyx) Ltd. one of the largest manufacturers of high-grade, enamelled signs in this country.

This firm is almost completely self-contained, in that practically every process in sign making is carried out in this one plant. Raw materials go in, and the finished product comes out.

Let us first deal with porcelain enamel metal signs. Sheet steel comes in, and in the metalwork shops the various intricate parts of the hundreds of different designs are pressed out, cut and assembled for making the bases of the signs.

Most of the signs are very sturdy, and the parts are welded together to their required form ready for the enamelling process.

These bases are then given a thorough cleaning in successive acid baths, and are sent on to the enamelling plant.

Vitreous enamels take many forms usually manufactured by specialist manufacturers and supplied to the enamellers as frits (akin to powdered glass). The appropriate frits together with colouring additions are ground with water to a controlled fineness in large drum-like vessels and when ready for use the slop (as it is called) resembles in appearance and feel an ordinary household distemper.

The enamels have to be coloured to the exact requirements of the customers' designs, so this firm has a highly skilled team of colour mixers.

The colouring pigments are carefully added to the mixed enamel, and wide experience has taught the mixers just exactly the weights, to very fine limits, needed to produce almost any shade of colour asked for.

Ground coat first

In the enamelling shops the metal signs are first given a ground coat (a special enamel which allows successive coatings to adhere permanently).

When this coat has been sprayed on under pressure the true nature of enamel can be appreciated. It lies like a dryish coating of grey clay, and can easily be rubbed off, like powder, with the bare fingers. Nothing could seem less durable.

Now Mr. Therm take a hand. The signs are carefully racked and hauled into the huge gas-fired oven for 'firing'.

This oven is lined with refractory bricks which are directly heated by radiant gas burners, and temperatures of up to 1,000°C. are quickly achieved, though in most cases about 800° is enough.

This fuses the hitherto flimsy coating into a homogeneous layer of durable vitreous enamel.

The temperatures vary according to the type of signs and the stages of 'development' of the enamel to its finished state. This 'development' is controlled by a small electric gadget, which keeps the process exactly to its 'programme'.

'Gas is ideal for this type of oven,' said Mr. Michael Burnham, a director of the firm. 'It is so easy to control the process through its quick changes of temperature, and we can rapidly work up the right heat at the start of each day's operations.'

In continuous use

The signs stay in the oven for up to 20 minutes, according to type, and are then drawn out for cooling. Of course, there are always others to go in at various stages of finishing, so the oven is in almost continuous use.

The cooled signs are now ready to have their colours applied. The first coating is always white, and then the designs and lettering are applied on the top.

Some of the standardised small lettering on flat surfaces can be put on by simple transfers, but most of the designs and other lettering are arranged in their appropriate places by cut-out stencils. But each colour must be fired on in the oven quite separately, so that some signs must go into the oven a number of times before completion.

Looking at the enamel as it is

applied in its raw state, it looks but some vague, pale relative of the eventual colour it emerges from the oven after its ' development '.

For instance, pure white enamel looks like a grey dust, while brilliant pillar-box red appears as an anaemic brick colour.

It is really fascinating to watch these signs finally emerging as gleaming London Transport bus-stops, or shiny R.A.C. signs, or appeals, and orders, to smoke somebody's brand of cigarettes.

Permanent finish

The thickness of the glassy enamel gives them as permanent a finish as one could think possible, considering the dusty nature of the original coating.

Burnham & Company send these signs to all parts of these islands, and they have their own departments in many provincial centres, which distribute and erect the signs for customers, if necessary.

In another part of this works, Burnhams concentrate on the other side of their business—the production of enamelled glass signs and, here again, the vital firing operation is done by gas.

The glass is cut to shape, and the designs are put on through silk screen 'stencils' with cellulose-mixed enamels. These silk screens are all made in the firm's own drawing offices, and require very highly skilled treatment.

In its simplest form, a silk screen is placed over a glass sign, exactly aligned in position, and when a coat of enamel is laid on then it can only pass through the screen to those places on the sign where that particular colour should appear.

Each successive colour is screened on in its own turn and then the signs are placed in the big gas-heated oven for firing.

This process does not require a separate firing for each colour, but the time spent in the oven is much longer —usually several hours, as glass will not withstand the thermal shocks that steel can sustain, and it thus needs to be heated gently and cooled slowly for satisfactory annealing.

Working well

This high temperature gas-fired hot air oven was only recently installed in the works, with the co-operation of the Kent Suburban Industrial Representative, Mr. A. J. Shergold, and it is working very satisfactorily.

The indirectly-heated air is circulated at temperatures up to 600°C. and the temperature uniformity throughout the entire working space is within ±2°C.

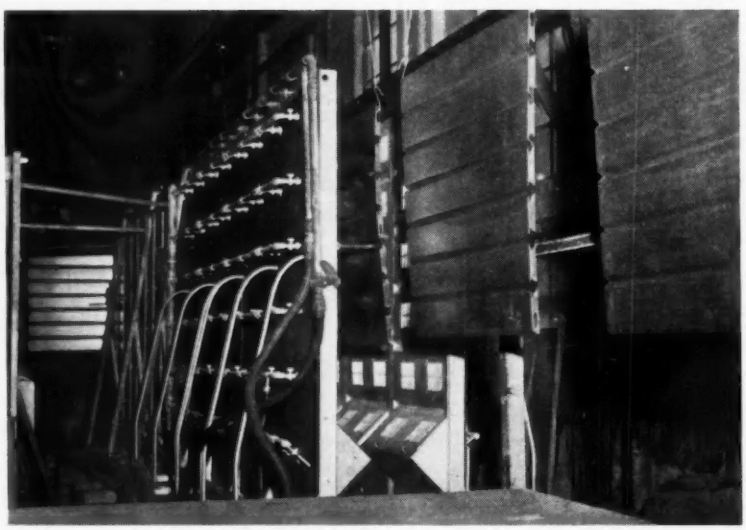
These glass signs, with the enamelled designs on the reverse side, are normally used for advertising on the outsides of shop windows, and for illuminated signs that hang outside shops, garages and public houses.

Many of the metalwork parts of such signs are also made in the Burnham works, and the electrical parts fitted, too.

Complicated designs

There were some beautifully-coloured and highly complicated designs—including a lavish creation for the recent highly-advertised machines that automatically mix paint to any one of the retail customer's needs, many hundreds of shades in all.

This is only one of the many makers of vitreous enamelled signs who choose gas ovens in their processes, but there are scores more up and down the country who make good use of Mr. Therm's first-class services.



Photograph shows pressed panels leaving the infra red gas oven supplied by Parkinson Cowan Industrial Products, of Cottage Lane Works, City Road, London, E.C.1., to Edward Curran Engineering Ltd., Cardiff.

The panels, which are made of 16 s.w.g. steel, pass through the 20-ft. long oven at the rate of 2½ ft. per minute for grease burning, before pickling and vitreous enamelling.

Gas consumption of the 92 Parkinson Schwank gas radiant burners involved is about 24 therms per hour—a running cost of about 28s. per hour.

As a result of installing the oven, Edward Curran Engineering Ltd. have saved both time and money by having all cleaning operations on a completely continuous cycle with no intermediate handling.

Flame detector price cut

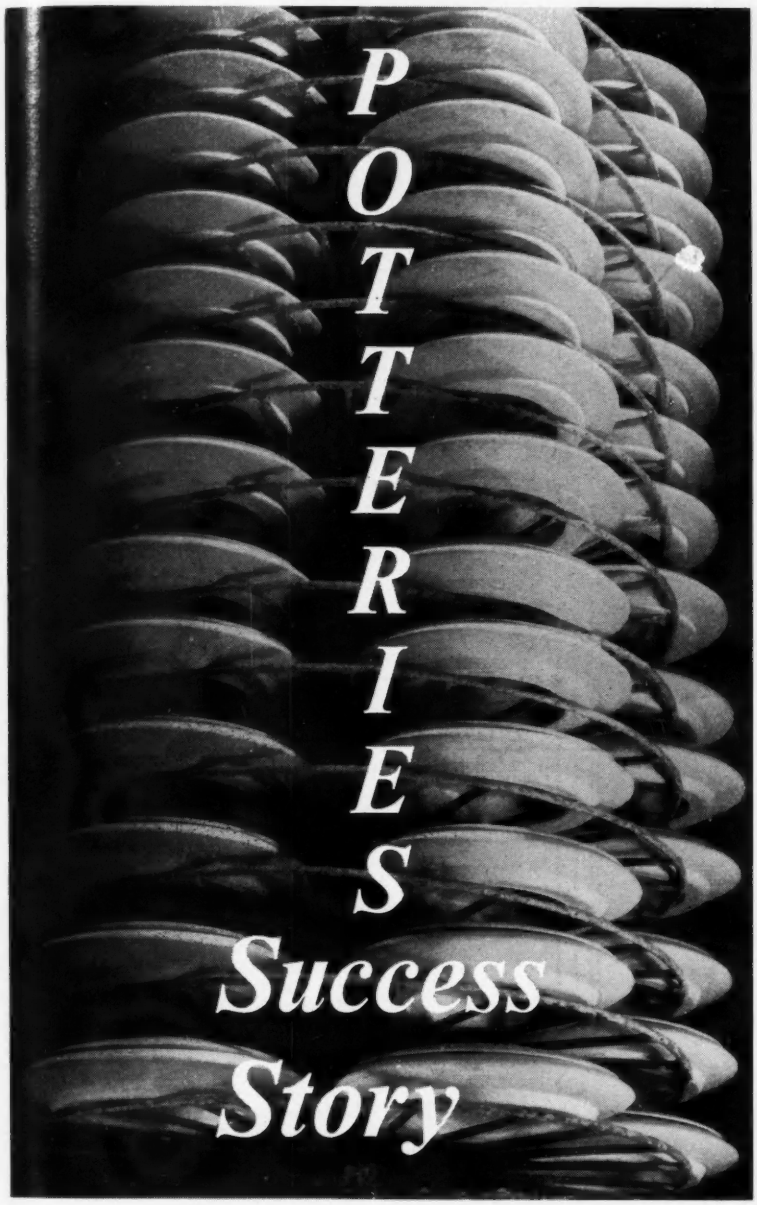
THE Honeywell Ultra-Vision flame detector has been reduced from £66 11s. to £45 (list), as a result of increased acceptance of the unit in the United Kingdom.

The Ultra - Vision detector, described by Honeywell Controls Ltd. as a dramatic breakthrough in combustion safeguards, is generally used in conjunction with a flame failure relay.

Safety device

It is a ' foolproof ' safety device for furnaces and ovens, because it senses only the ultra-violet radiation in a flame, and ignores refractory radiation and other simulated flame conditions.

Introduced to this country in 1960, the Ultra-Vision detector is now in use in a number of installations in the steel, electricity, petroleum, chemical and all fuel-using industries.



WHEN a coal-fired steam boiler nears the end of its working life and many modifications are needed to meet the Clean Air Act, what should a firm do?

The answer? USE MORE GAS . . . . and this led to the biggest single gas conversion scheme so far undertaken in the Potteries in conjunction with the West Midlands Gas Board.

WITHIN the space of 11 years, the well-known firm of Washington Pottery Ltd., Hanley, Stoke-on-Trent, has been modernised and extended at a cost of more than £150,000.

These progressive measures have been more than justified; output has trebled, the venture has paid for itself, and export activities are being extended.

An important feature of the new developments has been the question of drying and space heating. Although gas had been used for many years for firing ware, the firm had been dependent on a coal-fired steam boiler for the whole of their factory process.

This boiler, however, was approaching the end of its working life; it also required many modifications to conform with the Clean Air Act.

The solution lay in the extended use of gas and this led eventually to the biggest single gas conversion scheme so far undertaken in the Potteries in conjunction with the West Midlands Gas Board.

The first step was experimental. A steam glaze dryer was adapted to establish if town gas could be successfully applied. An air heater recently developed by the Gas Board was used on the glaze dryer and a secondary meter was fitted to carry out tests on running costs.

The results were entirely satisfactory, and the firm's directors decided on a complete conversion involving no fewer than 26 driers and including among the new equipment 34 overhead space heaters.

The whole of the work was carried out while the factory was in operation and without any interruption in production. The installation has proved a complete success.

Overall running costs are considerably reduced, the factory is smokeless and much cleaner, while fuel is used only where it is needed at a particular time.

Increased flexibility in production can mean—as and when required—a step up of more than 10% in productivity.

For the Gas Board the new development means an estimated extra gas consumption of 11½ mill. cu.ft., or 57,000 therms per annum. With the 140,000 therms previously being used for firing, the total gas used at the firm now equals that of an estate of more than 2,000 houses.

Washington Pottery—their speciality is high-class domestic earthenware—will finally complete the modernisation scheme this Autumn. The firm has a history going back to 1880, when the original building was erected for the manufacture of pottery.

It was used as a storage factory during the Second World War, and in 1946 was bought by the Tittensor family, who have been responsible for building it up into the forward-looking concern it is now.

GAS IN INDUSTRY

First published in May 1958, to bring to the fast developing industrial gas field the same high technical standard and exclusive qualities associated with the "GAS JOURNAL". In the first 12 months its circulation had reached 5,000. It is still growing fast, and with the new "Journal" distribution this year it well exceeds 8,000 copies monthly.

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